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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/779,703

Applicant(s)

TOHDO ET AL.

Examiner

Qing Chen

Art Unit

2191

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20040218</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This is the initial Office action based on the application filed on February 18, 2004.
2. **Claims 1-31** are pending.

Claim Objections

3. **Claims 1-31** are objected to because of the following informalities:
 - **Claim 1** recites the limitation “the method.” Applicant is advised to change this limitation to read “the control program testing method” for the purpose of providing it with proper explicit antecedent basis.
 - **Claims 2-12** depend on Claim 1 and, therefore, suffer the same deficiency as Claim 1.
 - **Claims 1, 13, 25, and 29** recite the limitation “the programming language.” Applicant is advised to change this limitation to read “the certain programming language” for the purpose of providing it with proper explicit antecedent basis.
 - **Claims 2-12** depend on Claim 1 and, therefore, suffer the same deficiency as Claim 1.
 - **Claims 14-24** depend on Claim 13 and, therefore, suffer the same deficiency as Claim 13.
 - **Claims 26-28** depend on Claim 25 and, therefore, suffer the same deficiency as Claim 25.
 - **Claims 30 and 31** depend on Claim 29 and, therefore, suffer the same deficiency as Claim 29.

Art Unit: 2191

- **Claims 2-12, 14-24, 26-28, 30, and 31** contain a typographical error: the article used to designate the statutory category of invention (*i.e.*, control program testing method, control program testing apparatus, and control program testing program) should be changed from “A” to “The.”
- **Claims 11 and 23** contain a typographical error: “at least one of the variable value” should presumably read -- at least one of the variable values --.
- **Claims 12 and 24** contain a typographical error: “the operation result” should presumably read -- the operation results --.
- **Claim 13** recites the limitation “the apparatus.” Applicant is advised to change this limitation to read “the control program testing apparatus” for the purpose of providing it with proper explicit antecedent basis.
- **Claims 14-24** depend on Claim 13 and, therefore, suffer the same deficiency as Claim 13.
- **Claims 25 and 29** contain the following typographical errors:
 - “as means for execution” should presumably read -- means for executing --.
 - The comma (,) after the first limitation should be changed to a semicolon (;).
- **Claims 25 and 29** recite the limitation “the program.” Applicant is advised to change this limitation to read “the control program testing program” for the purpose of providing it with proper explicit antecedent basis.
- **Claims 26-28** depend on Claim 25 and, therefore, suffer the same deficiency as Claim 25.

Art Unit: 2191

- **Claims 30 and 31** depend on Claim 29 and, therefore, suffer the same deficiency as Claim 29.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 2-5, 10, 11, 14-23, and 25-31** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2, 14, 25, 28, and 29 recite the limitation “the correspondence relationship.”

There is insufficient antecedent basis for this limitation in the claims. In the interest of compact prosecution, the Examiner subsequently interprets this limitation as reading “correspondence relationship” for the purpose of further examination.

Claims 3 and 4 depend on Claim 2 and, therefore, suffer the same deficiency as Claim 2.

Claims 15-22 depend on Claim 14 and, therefore, suffer the same deficiency as Claim

14.

Claims 26 and 27 depend on Claim 25 and, therefore, suffer the same deficiency as Claim 25.

Art Unit: 2191

Claims 30 and 31 depend on Claim 29 and, therefore, suffer the same deficiency as Claim 29.

Claim 5 recites the limitation “the individual operation results.” There is insufficient antecedent basis for this limitation in the claim. In the interest of compact prosecution, the Examiner subsequently interprets this limitation as reading “individual operation results” for the purpose of further examination.

Claims 10 and 22 recite the limitation “the execution spot.” There is insufficient antecedent basis for this limitation in the claims. In the interest of compact prosecution, the Examiner subsequently interprets this limitation as reading “an execution spot” for the purpose of further examination.

Claims 11 and 23 recite the limitations “the variable value,” “the suspend point,” and “the values.” There are insufficient antecedent basis for these limitations in the claims. In the interest of compact prosecution, the Examiner subsequently interprets these limitations as reading “variable values,” “a suspend point,” and “variable values,” respectively, for the purpose of further examination.

Claim 19 recites the limitations “the simulation sequence” and “the execution sequence.” There are insufficient antecedent basis for these limitations in the claim. In the interest of compact prosecution, the Examiner subsequently interprets these limitations as reading “a

Art Unit: 2191

simulation sequence” and “an execution sequence,” respectively, for the purpose of further examination.

Claim 22 recites the limitations “the simulation spot” and “the time point.” There are insufficient antecedent basis for these limitations in the claim. In the interest of compact prosecution, the Examiner subsequently interprets these limitations as reading “a simulation spot” and “a time point,” respectively, for the purpose of further examination.

Claims 25, 29, and 30 recite the limitations “the simulation result” and “the execution result.” There are insufficient antecedent basis for these limitations in the claims. In the interest of compact prosecution, the Examiner subsequently interprets these limitations as reading “simulation result” and “execution result,” respectively, for the purpose of further examination.

Claims 26-28 depend on Claim 25 and, therefore, suffer the same deficiency as Claim 25.

Claim 31 depends on Claim 29 and, therefore, suffers the same deficiency as Claim 29.

Claim 29 recites the limitation “the suspend point.” There is insufficient antecedent basis for this limitation in the claim. In the interest of compact prosecution, the Examiner subsequently interprets this limitation as reading “a suspend point” for the purpose of further examination.

Claims 30 and 31 depend on Claim 29 and, therefore, suffer the same deficiency as Claim 29.

Claim 30 recites the limitation “the operation results.” There is insufficient antecedent basis for this limitation in the claim. In the interest of compact prosecution, the Examiner subsequently interprets this limitation as reading “operation results” for the purpose of further examination.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. **Claims 13-31** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 13-24 contain “means-plus-function” limitations and appear to be apparatus. However, it is noted that the specification does not disclose any specific corresponding structure or equivalents thereof. The recited means appear to lack the necessary physical components (hardware) to constitute a machine or manufacture under § 101. Therefore, these claim limitations can be reasonably interpreted as computer program modules—software *per se*. The claims are directed to apparatus of functional descriptive material *per se*, and hence non-statutory.

The claims constitute computer programs representing computer listings *per se*. Such descriptions or expressions of the programs are not physical “things.” They are neither computer components nor statutory processes, as they are not “acts” being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer, which permit the computer program’s functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element, which defines structural and functional interrelationships between the computer program and the rest of the computer, that permits the computer program’s functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claims 25-31 contain “means-plus-function” limitations and appear to be programs. However, it is noted that the specification does not disclose any specific corresponding structure or equivalents thereof. The recited means appear to lack the necessary physical components (hardware) to constitute a machine or manufacture under § 101. Therefore, these claim limitations can be reasonably interpreted as computer program modules—software *per se*.

Claims 25-31 are rejected for the same reasons set forth in the rejections of Claims 13-24.

Claims 25-31 are directed to programs of functional descriptive material *per se*, and hence non-statutory. The claims constitute computer programs representing computer listings *per se*. Such descriptions or expressions of the programs are not physical “things.” They are neither

Art Unit: 2191

computer components nor statutory processes, as they are not “acts” being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer, which permit the computer program’s functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element, which defines structural and functional interrelationships between the computer program and the rest of the computer, that permits the computer program’s functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. **Claims 1, 2, 6-8, 13, 14, and 18-20** are rejected under 35 U.S.C. 102(e) as being anticipated by Whitehill et al. (US 6,708,329).

As per **Claim 1**, Whitehill et al. disclose:

- producing operation results of a simulation means which simulates operation of the control model and operation results of program execution means which executes the control

Art Unit: 2191

program, while making a relational linkage between individual corresponding operation results *(see Column 4: 25-49, "... a network protocol concept is initially designed and simulated on a simulation or modeling tool. Software modules in the form of source code are produced and developed in accordance with the design, and basically include functionality of system components. The software and other modules associated with the simulation (e.g., collectively referred to herein as simulation modules) are utilized by the simulation tool to simulate the designed protocol."* and *"Once the simulation is verified, system requirements and detailed design generally commences to direct development of software for actual system hardware (e.g., commonly referred to as a target system)."* and *"... the simulation modules are directly translated into target modules (e.g., modules compatible with and executable on a target system platform), thereby enabling the simulation tool to be utilized for system definition and requirements and software development."*); and

- testing presence or absence of abnormality in at least one of the control model and the control program *(see Column 4: 25-49, "The target system is subsequently tested and compared to the simulation to verify target system operation."; Column 6: 7-13, "When errors are encountered between actual and simulated results, the translation system is typically modified to correct these errors.").*

As per **Claim 2**, the rejection of **Claim 1** is incorporated; and Whitehill et al. further disclose:

- wherein the relational linkage is made based on correspondence information which indicates correspondence relationship between the control model which is provided at automatic

Art Unit: 2191

generation of control program by the automatic code generation means and a control program which is produced from the control model (*see Column 6: 38-51, "Templates 38 basically serve as a target module shell or skeleton, and initially contain information and code needed within target modules." and "Function set 40 is utilized to replicate on the target system platform simulation tool functions residing within the simulation modules. The function set basically performs substantially the same tasks as the corresponding simulation tool functions, but is modified for compatibility with the target system platform."*).

As per **Claim 6**, the rejection of **Claim 2** is incorporated; and Whitehill et al. further disclose:

- wherein the testing of the presence or absence of abnormality is implemented by comparing means which compares successively between the operation results of the simulation means and the operation results of the program execution means in relational linkage (*see Column 9: 16-23, "The resulting templates are searched at step 94 to replace specific functions with functions compatible with the target system platform."*).

As per **Claim 7**, the rejection of **Claim 6** is incorporated; and Whitehill et al. further disclose:

- wherein the successive comparison between the operation results of the simulation means and the operation results of the program execution means by the comparing means is implemented in terms of comparison between simulation sequence of the control model and execution sequence of the control program based on the correspondence information (*see*

Art Unit: 2191

Column 9: 16-23, "The resulting templates are searched at step 94 to replace specific functions with functions compatible with the target system platform.").

As per **Claim 8**, the rejection of **Claim 6** is incorporated; and Whitehill et al. further disclose:

- wherein the successive comparison between the operation results of the simulation means and the operation results of the program execution means by the comparing means is implemented in terms of comparison between variable values which are calculated by the simulation of the control model and variable values which are calculated by the execution of the control program based on the correspondence information (*see Column 9: 16-23, "... certain functions in the simulation tool define data streams in a particular manner. These functions are replaced with functions (e.g., typically included within function set 40) for compatibility with the target system platform to enable information to be transferred between functional elements."*).

Claims 13, 14, and 18-20 are control program testing apparatus claims corresponding to the control program testing method claims above (Claims 1, 2, and 6-8) and, therefore, are rejected for the same reasons set forth in the rejections of Claims 1, 2, and 6-8.

Art Unit: 2191

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. **Claims 3-5, 9-12, 15-17, and 21-31** are rejected under 35 U.S.C. 103(a) as being unpatentable over Whitehill et al. (US 6,708,329) in view of Duboc et al. (US 6,587,995).

As per **Claim 3**, the rejection of **Claim 2** is incorporated; however, Whitehill et al. do not disclose:

- wherein the relational linkage is made for one of the control model and the control program based on the setting of a break point which specifies a suspend point of operation and for the other based on a setting of a corresponding break point based on the correspondence information.

Duboc et al. disclose:

- wherein the relational linkage is made for one of the control model and the control program based on the setting of a break point which specifies a suspend point of operation and for the other based on a setting of a corresponding break point based on the correspondence information (*see Column 5: 6-15, "A debug operation may include any number of debugging functions, including for example, single-step operations and multi-step operations for use in*

Art Unit: 2191

performing step-wise simulation, breakpoint operations to halt a simulation on occurrence of specific events ...").

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Duboc et al. into the teaching of Whitehill et al. to include wherein the relational linkage is made for one of the control model and the control program based on the setting of a break point which specifies a suspend point of operation and for the other based on a setting of a corresponding break point based on the correspondence information. The modification would be obvious because one of ordinary skill in the art would be motivated to verify the proper interaction of the core with other components in a design (*see Duboc et al. – Column 2: 46-51*).

As per **Claim 4**, the rejection of **Claim 3** is incorporated; however, Whitehill et al. do not disclose:

- wherein the break point is adapted to set individually for functional blocks which constitute the control model.

Duboc et al. disclose:

- wherein the break point is adapted to set individually for functional blocks which constitute the control model (*see Column 11: 48-51, "Window 110 may include a number of breakpoint selection controls 112 that permit a user to select various conditional breakpoints at which to stop execution of a simulation."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Duboc et al. into the teaching of Whitehill et

Art Unit: 2191

al. to include wherein the break point is adapted to set individually for functional blocks which constitute the control model. The modification would be obvious because one of ordinary skill in the art would be motivated to verify the proper interaction of the core with other components in a design (see Duboc et al. – Column 2: 46-51).

As per **Claim 5**, the rejection of **Claim 2** is incorporated; however, Whitehill et al. do not disclose:

- wherein output of operation results, with the relational linkage being made between individual operation results, is implemented based on the execution and suspend of the control program, one line at a time, by the program execution means.

Duboc et al. disclose:

- wherein output of operation results, with the relational linkage being made between individual operation results, is implemented based on the execution and suspend of the control program, one line at a time, by the program execution means (see Column 5: 6-15, “A debug operation may include any number of debugging functions, including for example, single-step operations and multi-step operations for use in performing step-wise simulation ...”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Duboc et al. into the teaching of Whitehill et al. to include wherein output of operation results, with the relational linkage being made between individual operation results, is implemented based on the execution and suspend of the control program, one line at a time, by the program execution means. The modification would be

Art Unit: 2191

obvious because one of ordinary skill in the art would be motivated to verify the proper interaction of the core with other components in a design (see Duboc et al. – Column 2: 46-51).

As per **Claim 9**, the rejection of **Claim 8** is incorporated; however, Whitehill et al. do not disclose:

- wherein the testing of the presence or absence of abnormality by comparison between the variable values which are calculated by the simulation of the control model and the variable values which are calculated by the execution of the control program based on the correspondence information is implemented in terms of determination as to whether or not the difference between the variable values calculated by the simulation of the control model and the variable values calculated by the execution of the control program is within an allowable range.

Duboc et al. disclose:

- wherein the testing of the presence or absence of abnormality by comparison between the variable values which are calculated by the simulation of the control model and the variable values which are calculated by the execution of the control program based on the correspondence information is implemented in terms of determination as to whether or not the difference between the variable values calculated by the simulation of the control model and the variable values calculated by the execution of the control program is within an allowable range (see Column 14: 31-43, “... more complex breakpoint conditions may be used, e.g., whether a monitored node has a state that is greater than or less than a certain value, whether the monitored node has a state in a certain range, etc.”).

Art Unit: 2191

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Duboc et al. into the teaching of Whitehill et al. to include wherein the testing of the presence or absence of abnormality by comparison between the variable values which are calculated by the simulation of the control model and the variable values which are calculated by the execution of the control program based on the correspondence information is implemented in terms of determination as to whether or not the difference between the variable values calculated by the simulation of the control model and the variable values calculated by the execution of the control program is within an allowable range. The modification would be obvious because one of ordinary skill in the art would be motivated to verify the proper interaction of the core with other components in a design (*see Duboc et al. – Column 2: 46-51*).

As per **Claim 10**, the rejection of **Claim 6** is incorporated; however, Whitehill et al. do not disclose:

- producing, in the event of determination of the presence of abnormality by the comparing means, a simulation spot of the control model and an execution spot of the control program at a time point of the determination as a result of the test.

Duboc et al. disclose:

- producing, in the event of determination of the presence of abnormality by the comparing means, a simulation spot of the control model and an execution spot of the control program at a time point of the determination as a result of the test (*see Column 14: 44-52, "Once all active breakpoints have been tested, block 236 determines whether any breakpoint was hit. If*

Art Unit: 2191

so, control passes to block 224 to halt the simulation. In addition, it may be desirable to pass a message to the script via the message pipe to indicate that the breakpoint was hit. If no breakpoint is hit, however, block 236 passes control to block 204 to indicate the end of a clock cycle, whereby control then returns to block 200 to wait for the next cycle of the simulation.").

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Duboc et al. into the teaching of Whitehill et al. to include producing, in the event of determination of the presence of abnormality by the comparing means, a simulation spot of the control model and an execution spot of the control program at a time point of the determination as a result of the test. The modification would be obvious because one of ordinary skill in the art would be motivated to verify the proper interaction of the core with other components in a design (see Duboc et al. – Column 2: 46-51).

As per **Claim 11**, the rejection of **Claim 1** is incorporated; however, Whitehill et al. do not disclose:

- making alterable at least one of variable values held at a suspend point among variable values calculated by the simulation of the control model and variable values held at a suspend point among variable values calculated by the execution of the control program when the simulation of the control model and the execution of the control program are suspended during the test.

Duboc et al. disclose:

- making alterable at least one of variable values held at a suspend point among variable values calculated by the simulation of the control model and variable values held at a

Art Unit: 2191

suspend point among variable values calculated by the execution of the control program when the simulation of the control model and the execution of the control program are suspended during the test (*see Column 14: 10-15, "Next, block 222 determines whether the single-step mode is activated. If so, control passes to block 224 to halt the simulation and return control to the user to either update the debug parameters, view the current results, or perform other activities until the user specifically commands the simulator to restart the simulation on the next clock cycle."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Duboc et al. into the teaching of Whitehill et al. to include making alterable at least one of variable values held at a suspend point among variable values calculated by the simulation of the control model and variable values held at a suspend point among variable values calculated by the execution of the control program when the simulation of the control model and the execution of the control program are suspended during the test. The modification would be obvious because one of ordinary skill in the art would be motivated to verify the proper interaction of the core with other components in a design (*see Duboc et al. – Column 2: 46-51*).

As per **Claim 12**, the rejection of **Claim 1** is incorporated; however, Whitehill et al. do not disclose:

- producing at least the operation results of the simulation means which simulates the operation of the control model and the operation results of the program execution means which executes the control program to display means to display visually.

Duboc et al. disclose:

- producing at least the operation results of the simulation means which simulates the operation of the control model and the operation results of the program execution means which executes the control program to display means to display visually (*see Column 7: 39-45, "Communication between the debug GUI script 44 and debug monitor 52 is provided through a communications channel 54, with debug parameters used to configure the debug monitor transmitted from the debug GUI script 44 to the debug monitor, and with results of the debug operations transmitted by the debug monitor 52 to the script for display to the user."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Duboc et al. into the teaching of Whitehill et al. to include producing at least the operation results of the simulation means which simulates the operation of the control model and the operation results of the program execution means which executes the control program to display means to display visually. The modification would be obvious because one of ordinary skill in the art would be motivated to provide user with test information.

Claims 15-17 and 21-24 are rejected for the same reasons set forth in the rejections of Claims 3-5 and 9-12, respectively.

As per **Claim 25**, Whitehill et al. disclose:

- means for executing through a computer for testing presence or absence of abnormality in at least one of the control model and the control program (*see Figure 1: 12;*

Column 4: 25-49, "The target system is subsequently tested and compared to the simulation to verify target system operation."; Column 6: 7-13, "When errors are encountered between actual and simulated results, the translation system is typically modified to correct these errors.";

- means for generating, from information provided at automatic generation of the control program, correspondence information which indicates correspondence relationship between the control model and the control program, and making a relational linkage between a suspend point of operation of simulation means which simulates the control model based on the correspondence information (*see Column 4: 25-49, "... the simulation modules are directly translated into target modules (e.g., modules compatible with and executable on a target system platform), thereby enabling the simulation tool to be utilized for system definition and requirements and software development."*);

- means for directing the simulation means and the program execution means to proceed to the simulation and the program execution (*see Column 4: 25-49, "... a network protocol concept is initially designed and simulated on a simulation or modeling tool."* and *"Once the simulation is verified, system requirements and detailed design generally commences to direct development of software for actual system hardware (e.g., commonly referred to as a target system)."*); and

- means for comparing simulation result of the control model and execution result of the control program upon detecting suspends of simulation and program execution, and testing the presence or absence of abnormality based on the comparison result (*see Column 4: 25-49, "The target system is subsequently tested and compared to the simulation to verify target system*

Art Unit: 2191

operation.”; Column 6: 7-13, “When errors are encountered between actual and simulated results, the translation system is typically modified to correct these errors.”).

However, Whitehill et al. do not disclose:

- means for detecting a suspend of the simulation means and a suspend of the program execution means following the simulation and program execution.

Duboc et al. disclose:

- means for detecting a suspend of the simulation means and a suspend of the program execution means following the simulation and program execution (*see Column 5: 6-15, “A debug operation may include any number of debugging functions, including for example, single-step operations and multi-step operations for use in performing step-wise simulation, breakpoint operations to halt a simulation on occurrence of specific events ...”*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Duboc et al. into the teaching of Whitehill et al. to include means for detecting a suspend of the simulation means and a suspend of the program execution means following the simulation and program execution. The modification would be obvious because one of ordinary skill in the art would be motivated to verify the proper interaction of the core with other components in a design (*see Duboc et al. – Column 2: 46-51*).

As per **Claim 26**, the rejection of **Claim 25** is incorporated; and Whitehill et al. further disclose:

- wherein the correspondence information includes execution position correspondence information which is information indicating the relationship between corresponding positions of

Art Unit: 2191

the control model and the control program (*see Column 6: 38-51, "Templates 38 basically serve as a target module shell or skeleton, and initially contain information and code needed within target modules." and "Function set 40 is utilized to replicate on the target system platform simulation tool functions residing within the simulation modules. The function set basically performs substantially the same tasks as the corresponding simulation tool functions, but is modified for compatibility with the target system platform."*).

However, Whitehill et al. do not disclose:

- wherein the means for making a relational linkage of suspend points based on the correspondence information is that which sets, by being rendered the setting of a break point which specifies a suspend point of operation of one of the simulation means and the program execution means, a break point which specifies a corresponding spot of the other based on the execution position correspondence information.

Duboc et al. disclose:

- wherein the means for making a relational linkage of suspend points based on the correspondence information is that which sets, by being rendered the setting of a break point which specifies a suspend point of operation of one of the simulation means and the program execution means, a break point which specifies a corresponding spot of the other based on the execution position correspondence information (*see Column 5: 6-15, "A debug operation may include any number of debugging functions, including for example, single-step operations and multi-step operations for use in performing step-wise simulation, breakpoint operations to halt a simulation on occurrence of specific events ..."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Duboc et al. into the teaching of Whitehill et al. to include wherein the means for making a relational linkage of suspend points based on the correspondence information is that which sets, by being rendered the setting of a break point which specifies a suspend point of operation of one of the simulation means and the program execution means, a break point which specifies a corresponding spot of the other based on the execution position correspondence information. The modification would be obvious because one of ordinary skill in the art would be motivated to verify the proper interaction of the core with other components in a design (*see Duboc et al. – Column 2: 46-51*).

As per **Claim 27**, the rejection of **Claim 26** is incorporated; however, Whitehill et al. do not disclose:

- wherein the means for testing the presence or absence of abnormality based on the comparison result tests the presence or absence of abnormality by at least comparing the suspend point of simulation of the control model and the suspend point of execution of the control program based on the execution position correspondence information.

Duboc et al. disclose:

- wherein the means for testing the presence or absence of abnormality based on the comparison result tests the presence or absence of abnormality by at least comparing the suspend point of simulation of the control model and the suspend point of execution of the control program based on the execution position correspondence information (*see Column 14: 44-52, "Once all active breakpoints have been tested, block 236 determines whether any breakpoint*

was hit. If so, control passes to block 224 to halt the simulation. In addition, it may be desirable to pass a message to the script via the message pipe to indicate that the breakpoint was hit. If no breakpoint is hit, however, block 236 passes control to block 204 to indicate the end of a clock cycle, whereby control then returns to block 200 to wait for the next cycle of the simulation.").

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Duboc et al. into the teaching of Whitehill et al. to include wherein the means for testing the presence or absence of abnormality based on the comparison result tests the presence or absence of abnormality by at least comparing the suspend point of simulation of the control model and the suspend point of execution of the control program based on the execution position correspondence information. The modification would be obvious because one of ordinary skill in the art would be motivated to verify the proper interaction of the core with other components in a design (see Duboc et al. – Column 2: 46-51).

As per **Claim 28**, the rejection of **Claim 25** is incorporated; and Whitehill et al. further disclose:

- wherein the correspondence information includes variable correspondence information which indicates correspondence relationship between variable values pertaining to processing of the control model and variable values pertaining to processing of the control program (see Column 9: 16-23, "... certain functions in the simulation tool define data streams in a particular manner. These functions are replaced with functions (e.g., typically included within function set 40) for compatibility with the target system platform to enable information to be transferred between functional elements. "), and

- wherein the means for testing the presence or absence of abnormality based on the comparison result tests the presence or absence of abnormality by at least comparing the variable values calculated by the simulation of the control model and the variable values calculated by the execution of the control program based on the variable correspondence information (*see Column 9: 16-23, "... certain functions in the simulation tool define data streams in a particular manner. These functions are replaced with functions (e.g., typically included within function set 40) for compatibility with the target system platform to enable information to be transferred between functional elements."*).

As per **Claim 29**, Whitehill et al. disclose:

- means for executing through a computer for testing of presence or absence of abnormality in at least one of the control model and the control program (*see Figure 1: 12; Column 4: 25-49, "The target system is subsequently tested and compared to the simulation to verify target system operation."; Column 6: 7-13, "When errors are encountered between actual and simulated results, the translation system is typically modified to correct these errors."*);

- means for generating, from information provided at automatic generation of the control program, correspondence information which indicates correspondence relationship between the control model and the control program, and making a relational linkage between a suspend point of operation of simulation means which simulates the control model based on the correspondence information (*see Column 4: 25-49, "... the simulation modules are directly translated into target modules (e.g., modules compatible with and executable on a target system*

Art Unit: 2191

platform), thereby enabling the simulation tool to be utilized for system definition and requirements and software development.”);

- means for directing the simulation means and the program execution means to proceed to the simulation and the program execution (*see Column 4: 25-49, “... a network protocol concept is initially designed and simulated on a simulation or modeling tool.” and “Once the simulation is verified, system requirements and detailed design generally commences to direct development of software for actual system hardware (e.g., commonly referred to as a target system).”*); and

- means for producing simulation result of the simulation means and execution result of the program execution means upon detecting suspends of simulation and program execution (*see Column 4: 25-49, “The target system is subsequently tested and compared to the simulation to verify target system operation.”; Column 6: 7-13, “When errors are encountered between actual and simulated results, the translation system is typically modified to correct these errors.”*).

However, Whitehill et al. do not disclose:

- means for detecting a suspend of the simulation means and a suspend of the program execution means following the simulation and program execution.

Duboc et al. disclose:

- means for detecting a suspend of the simulation means and a suspend of the program execution means following the simulation and program execution (*see Column 5: 6-15, “A debug operation may include any number of debugging functions, including for example, single-step operations and multi-step operations for use in performing step-wise simulation, breakpoint operations to halt a simulation on occurrence of specific events ...”*).

• Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Duboc et al. into the teaching of Whitehill et al. to include means for detecting a suspend of the simulation means and a suspend of the program execution means following the simulation and program execution. The modification would be obvious because one of ordinary skill in the art would be motivated to verify the proper interaction of the core with other components in a design (*see Duboc et al. – Column 2: 46-51*).

As per **Claim 30**, the rejection of **Claim 29** is incorporated; however, Whitehill et al. do not disclose:

- wherein the means for producing simulation result of the simulation means and execution result of the program execution means comprises means for producing operation results to display means to display visually.

Duboc et al. disclose:

- wherein the means for producing simulation result of the simulation means and execution result of the program execution means comprises means for producing operation results to display means to display visually (*see Column 7: 39-45, "Communication between the debug GUI script 44 and debug monitor 52 is provided through a communications channel 54, with debug parameters used to configure the debug monitor transmitted from the debug GUI script 44 to the debug monitor, and with results of the debug operations transmitted by the debug monitor 52 to the script for display to the user."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Duboc et al. into the teaching of Whitehill et

Art Unit: 2191

al. to include wherein the means for producing simulation result of the simulation means and execution result of the program execution means comprises means for producing operation results to display means to display visually. The modification would be obvious because one of ordinary skill in the art would be motivated to provide user with test information.

As per **Claim 31**, the rejection of **Claim 29** is incorporated; and Whitehill et al. further disclose:

- wherein the correspondence information includes execution position correspondence information which is information indicating the relationship between corresponding positions of the control model and the control program (*see Column 6: 38-51, "Templates 38 basically serve as a target module shell or skeleton, and initially contain information and code needed within target modules." and "Function set 40 is utilized to replicate on the target system platform simulation tool functions residing within the simulation modules. The function set basically performs substantially the same tasks as the corresponding simulation tool functions, but is modified for compatibility with the target system platform."*).

However, Whitehill et al. do not disclose:

- wherein the means for making a relational linkage of suspend points based on the correspondence information is designed to set, by being rendered the setting of a break point which specifies a suspend point of operation of one of the simulation means and the program execution means, a break point which specifies a corresponding spot of the other based on the execution position correspondence information.

Duboc et al. disclose:

Art Unit: 2191

- wherein the means for making a relational linkage of suspend points based on the correspondence information is designed to set, by being rendered the setting of a break point which specifies a suspend point of operation of one of the simulation means and the program execution means, a break point which specifies a corresponding spot of the other based on the execution position correspondence information (*see Column 5: 6-15, "A debug operation may include any number of debugging functions, including for example, single-step operations and multi-step operations for use in performing step-wise simulation, breakpoint operations to halt a simulation on occurrence of specific events ..."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Duboc et al. into the teaching of Whitehill et al. to include wherein the means for making a relational linkage of suspend points based on the correspondence information is designed to set, by being rendered the setting of a break point which specifies a suspend point of operation of one of the simulation means and the program execution means, a break point which specifies a corresponding spot of the other based on the execution position correspondence information. The modification would be obvious because one of ordinary skill in the art would be motivated to verify the proper interaction of the core with other components in a design (*see Duboc et al. – Column 2: 46-51*).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Art Unit: 2191

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Qing Chen whose telephone number is 571-270-1071. The Examiner can normally be reached on Monday through Thursday from 7:30 AM to 4:00 PM. The Examiner can also be reached on alternate Fridays.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Wei Zhen, can be reached on 571-272-3708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2100 Group receptionist whose telephone number is 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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SUPERVISORY PATENT EXAMINER

QC / *QC*
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